



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/921,809	08/03/2001	Michael L. Perry	C-2462	8358

7590

04/23/2004

M. P. Williams
210 Main Street
Manchester, CT 06040

EXAMINER

CREPEAU, JONATHAN

ART UNIT PAPER NUMBER

1746

DATE MAILED: 04/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/921,809

Applicant(s)

PERRY ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-11 is/are allowed.
- 6) ☒ Claim(s) 2-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 2-11. Claims 7-11 are allowed. The arguments with regard to the §102 rejection of claims 2-6 are persuasive; however, these claims are newly rejected under 35 USC §103. As such, this action is non-final.

Claim Rejections - 35 USC § 103

2. Claims 2, 3, 5, and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy (U.S. Patent 6,251,534).

Regarding claim 3, the reference is directed to a fuel cell cascade flow system (see abstract). As shown in Figure 1, the system contains a first group of cells (200) and a second group of cells (300). The system comprises fuel inlet and outlet means (valves) which are settable in two conditions (see Fig. 1; col. 6, lines 8-50). The first condition is a normal "series" flow where the fuel must flow through each stack and the second condition is a "parallel" ("purge") flow where the fuel flows through each stack individually without passing through any other stacks. Regarding claim 3, the conditions are set by a controller (530), and the fuel is supplied from a source (405). Regarding claim 6, the system comprises fuel inlet manifolds (202, 302) and fuel exhaust manifolds (204, 304), the fuel inlet means (500) being disposed between the fuel source and the inlet manifold, and the fuel outlet means (510, 520) being disposed between the exhaust manifold and the system exhaust. Regarding claim 5, the fuel

Art Unit: 1746

outlet means includes a valve (510) between the exhaust and the last group and a valve (520) between the exhaust and the first and second groups. Regarding claims 2 and 3, the reference teaches in column 7, lines 18-30 that the invention is not limited to systems having only two cascaded groups (stacks) and that a plurality of stacks may be used.

However, the reference does not expressly teach that there are at least three groups (stacks) and that the number of fuel cells in each group exceeds the number of fuel cells in any group downstream thereof, as recited in claim 3.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use a cascade of at least three stacks, wherein the number of fuel cells in each group exceeds the number of fuel cells in any group downstream thereof. As noted above, the reference teaches that the invention is not limited to systems having only two cascaded groups. An artisan would be motivated to use three or more groups in order to increase the power output of the fuel cell. Similarly, the reference teaches that the number of fuel cells in each stack may be adjusted according to the desired power output of the system (col. 6, line 66 et seq.). As an example, the reference teaches progressively increasing stack sizes for low-power operation. Therefore, for high-power operation, the artisan would be motivated to use the opposite configuration, i.e., progressively decreasing stack sizes in the cascade. As such, for high-power operation, the claimed configuration of three stacks which progressively decrease in size would be obvious to a skilled artisan. Further, the artisan would be sufficiently skilled to modify the valve system of McElroy so as to render it suitable for a three-stack system.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over McElroy in view of Chen et al (U.S. Patent 5,985,474).

McElroy is applied for the reasons stated above. In addition, the reference teaches that the fuel inlet means comprises a blower (420) between the source (405) and the first stack (200) and a valve (500) between the source and the second (and third) stacks (see col. 6, line 21).

However, McElroy does not expressly teach that a *valve*, rather than a blower, is disposed between the source and the first stack, as recited in claim 4.

The patent of Chen et al. is directed to a fuel cell system. In column 8, line 23, the reference teaches that "[i]n addition, it will be appreciated that instead of valves, variable speed pumps and/or blowers may also be suitable for regulation of system 100, e.g., for controlling the flow of air, fuel and reformat."

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Chen et al. indicates that valves are functionally equivalent to blowers for controlling the movement of gases through a fuel cell system. Therefore, the artisan would be sufficiently skilled to replace the blower of McElroy with a valve. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

Response to Arguments

4. Applicant's arguments filed February 17, 2004 have been fully considered but they are not persuasive insofar as they are applicable to the present rejections. Applicants urge that McElroy teaches away from the claimed invention because it teaches progressively increasing stack sizes (column 7, line 5), whereas instant claim 3 calls for progressively decreasing stack sizes. However, the teaching of McElroy does not constitute a teaching away from the claimed invention because McElroy's teaching is merely an *example* of the system disclosed in the reference. This system is disclosed as being suitable for low-power operation. As noted above, the artisan would be sufficiently motivated to set up the system of McElroy in the claimed configuration in order to use it for *high-power operation*. Thus, McElroy does not in fact teach away from the claimed invention.

Applicants further assert that there is no teaching or suggestion of purging in McElroy. However, the system of McElroy *inherently* purges the system when it operates in non-cascaded mode (i.e., when fresh fuel flows through each stack). This is because the fresh fuel removes hydrogen-depleted fuel left over from the cascaded operation of the system. Further, the system of McElroy operates in a substantially identical manner to the claimed system. Therefore, since the claimed system is recited as having a purging function, the system of McElroy also inherently must have a purging function. As such, the claims are still not considered to be distinguished over McElroy.

Allowable Subject Matter

5. Claims 7-11 are allowed.
6. The following is a statement of reasons for the indication of allowable subject matter:

The reasons for allowance of claim 7 were given in the previous Office action and remain applicable herein.

Conclusion


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

Art Unit: 1746

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Patent Examiner
Art Unit 1746
April 20, 2004